

REMARKS

Claims 1-17 and 31-43 are pending in this application. By this Amendment, claims 1, 5, 8, 10, 13 and 17 are amended, claims 18-30 are canceled without prejudice or disclaimer and new claims 31-43 are added.

Applicant confirms that an election was made with traverse to prosecute Group I, claims 1-17.

The Office Action states that the oath is defective. Applicant is attaching another Declaration in which the mailing address of each inventor includes zip codes.

The Office Action rejects claims 1-9 under 35 U.S.C. §102(e) by U.S. Patent Publication 2003/0178730 to Rumer et al. (hereafter Rumer) or under 35 U.S.C. §102(e) by U.S. Patent 6,653,741 to Sreeram et al. (hereafter Sreeram). Still further, the Office Action rejects claims 10-17 under 35 U.S.C. §103(a) over Rumer in view of U.S. Patent Publication 2002/0079355 to Totino et al. (hereafter Totino) or under 35 U.S.C. §103(a) over Sreeram in view of Totino. The rejections are respectfully traversed with respect to the pending claims.

Independent claim 1 recites preparing a bonding surface of a heat dissipating member, and bonding a thermal interface material layer including a metallic solder to the bonding surface, the thermal interface material layer to thermally couple the heat dissipating member to a heat conducting component by an impermanent attachment. Independent claim 1 further recites the bonding including providing at least the thermal interface material in a vacuum chamber under

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vacuum conditions and heating the thermal interface material in the vacuum chamber to form liquid metallic solder.

The applied references do not teach or suggest all the features of independent claim 1. More specifically, independent claim 1 relates to a bonding of a thermal interface material layer including metallic solder to a bonding surface. Rumer does not disclose providing at least the thermal interface material in a vacuum chamber under vacuum conditions and heating the thermal interface material in the vacuum chamber to form liquid metallic solder. In addressing claims 10-12 and 14, the Office Action cites Rumer's paragraphs [0028] and [0029] as relating to the features of heating and reflowing solder. However, Rumer has no suggestion for providing a vacuum chamber under vacuum conditions and heating the thermal interface material in the vacuum chamber to form liquid metallic solder.

The Office Action (on pages 9-10) then references Totino as disclosing a vacuum chamber 10 with means of heating 11. See Totino's paragraphs [0020] and [0021]. However, Totino does not relate to a thermal interface material layer including metallic solder to be bonded to a bonding surface. Rather, Totino relates to manufacturing a plated product including a support part in steel and an anticorrosion metallic coating. See Totino's Abstract. Thus, Totino does not relate to the specific materials of Rumer and/or the present application.

There is no suggestion that Totino may be combined with Rumer as alleged in the Office Action. In particular, the Office Action asserts that it would have been obvious to modify Rumer to include a vacuum chamber with an inert atmosphere and pressure in order to establish

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a mechanical link between layers, to enhance the strength of the bonding process and so that the support and coating are tightened against each other to compress the brazing material. Applicants respectfully disagree as the materials provided in Rumer and Totino are different and there is no suggestion for the combination. Merely because a reference discloses a vacuum chamber and a means for heating, these features may not be simply combined with a different manufacturing process. Further, Rumer describes its process in paragraphs [0028] and [0029]. These disclosed techniques do not correspond with Totino. Accordingly, there is no suggestion to modify Rumer as alleged. The only suggestion for the claimed features is provided within applicants' own specification. Accordingly, the Office Action relies on impermissible hindsight in order to make this combination.

Additionally, at the time of the present invention, the present application and Rumer were commonly assigned to Intel Corporation and/or were under obligation of assignment to Intel Corporation. Accordingly, under 35 U.S.C. §103(c), Rumer is disqualified as a prior art reference in an obviousness-type combination.

Additionally, Sreeram and Totino also do not teach or suggest all the features of independent claim 1. More specifically, Sreeram does not disclose providing a thermal interface material in a vacuum chamber under vacuum conditions and heating the thermal interface material in the vacuum chamber to form liquid metallic solder. The Office Action (on page 12) then relies on Totino's paragraph [0020] and [0021] for these missing features. However, for at least similar reasons as set forth above, Sreeram may not be combined with Totino as alleged in

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the Office Action. In particular, the Office Action asserts that it would have been obvious to modify Sreeram to include a vacuum chamber with an inert atmosphere and pressure in order to establish a mechanical link between layers, to enhance the strength of the bonding process and so that the support and coating are tightened against each other to compress the brazing material. Applicants respectfully disagree as the materials provided in Sreeram and Totino are different. Merely because a reference discloses a vacuum chamber and a means for heating, these features may not be simply combined with a different manufacturing process. Further, Sreeram describes its process at col. 7, lines 20-24. These disclosed techniques do not correspond with Totino. Accordingly, there is no suggestion to modify Sreeram as alleged. The only suggestion for the claimed features is provided within applicants' own specification. Accordingly, the Office Action relies on impermissible hindsight in order to make this combination.

For at least the reasons set forth above, the applied references do not teach or suggest all the features of independent claim 1. Thus, independent claim 1 defines patentable subject matter.

Independent claim 15 recites placing a metallic solder and a heat dissipating member having a bonding surface into a vacuum chamber and placing the vacuum chamber under vacuum conditions. Independent claim 15 also recites heating the metallic solder to a temperature of greater than or equal to the melting point of the metallic solder to form a liquid metallic solder, providing a pressurized inert atmosphere in the vacuum chamber and disposing

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the liquid metallic solder on at least a portion of the bonding surface to form a liquid metallic solder layer. Still further, independent claim 15 recites removing at least a portion of the pressurized inert atmosphere from the vacuum chamber, and allowing the liquid metallic solder layer to cool to a temperature of less than the melting point of the metallic solder. For at least similar reasons as set forth above, the applied references do not teach or suggest all these features. Thus, independent claim 15 defines patentable subject matter.

Independent claim 31 recites providing a metallic solder in a vacuum chamber under vacuum conditions, heating the metallic solder to at least a melting temperature of the metallic solder while in the vacuum chamber and providing a pressurized inert atmosphere in the vacuum chamber. Independent claim 31 also recites providing the heated metallic solder on to a bonding surface, and allowing the heated metallic solder to cool to a temperature less than the melting point of the metallic solder. For at least similar reasons as set forth above, the applied references do not teach or suggest all these features. Thus, independent claim 31 defines patentable subject matter.

Accordingly, each of independent claims 1, 15 and 31 defines patentable subject matter. Each of the dependent claims depends from one of the independent claims and therefore defines patentable subject matter at least for this reason. In addition, the dependent claims recite features that further and independently distinguish over the applied references. For example, at least each of claims 10-13, 33-40 and 42-43 relate to features including a vacuum chamber. Rumer and Sreeram do not suggest these features. Additionally, Totino may not be combined

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with either of these references to obtain the claimed features. Accordingly, each of dependent claims 10-13, 33-40 and 42-43 defines patentable subject matter at least for this additional reason.

CONCLUSION

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of claims 1-17 and 31-43 are earnestly solicited. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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